Pesticide Monitoring Program - FY 2008

FDA Monitoring Program

- Regulatory Monitoring
  - Analytical Methods
  - FDA/State Cooperation
  - Animal Feeds
  - International Activities
  - Focused Sampling
- Total Diet Study
- FDA Pesticide Program Sampling Design
- Identification of Imports (Products or Countries) Requiring Special Attention or Additional Studies
- Acknowledgments
- References

Tables

1. Import Commodities That May Warrant Special Attention Based on FY 2007 Sampling Results
2. Countries of Origin That May Warrant Special Attention Based on FY 2007 Sampling Results

Results and Discussion FY 2007

- Regulatory Monitoring
  - Discussion
  - Geographic Coverage
  - Domestic/Import Violation Rate Comparison
  - Pesticide Coverage
  - Animal Feeds
  - Focused Sampling
- Total Diet Study
- Summary
  - Regulatory Monitoring
  - Total Diet Study

Appendices

A. Analysis of Domestic Samples by Commodity Group in 2007
B. Analysis of Import Samples by Commodity Group in 2007

Figures

Tables

This document is the twentieth report summarizing the results of the Food and Drug Administration's (FDA) pesticide residue monitoring program. Eight of the nineteen previous reports were published in the *Journal of the Association of Official Analytical Chemists/Journal of AOAC International*; these presented results from Fiscal Years (FY) 1987 through 1994. Results from FY 1993 through FY 2007 are published on FDA's Internet site at http://www.fda.gov/Food/FoodSafety/FoodContaminantsAdulteration/Pesticides/ResidueMonitoringReports/default.htm.

In the early 1990s, FDA conducted comprehensive incidence and level monitoring studies of four major foods and published the results[1, 2]. Due to resource constraints, incidence and level monitoring for pesticide residues conducted by FDA's field laboratories, which was typically non-regulatory in nature, has been replaced in recent years by regulatory based "focused sampling." Incidence and level pesticide residue data are, however, provided by FDA's Total Diet Study program. The TDS program analyzes market baskets of about 300 foods four times per year.

This report includes findings obtained during FY 2008 (October 1, 2007 through September 30, 2008) under regulatory monitoring along with selected Total Diet Study (TDS) findings. Results in this and earlier reports continue to demonstrate that levels of pesticide residues in the U.S. food supply are overwhelmingly in compliance with EPA's permitted pesticide uses and tolerances.

FDA Monitoring Program

Three federal government agencies share responsibility for the regulation of pesticides. The Environmental Protection Agency (EPA) registers (i.e., approves) the use of pesticides and establishes tolerances (the maximum amounts of residues that are permitted in or on a food) if use of a particular pesticide may result in residues in or on food [3]. Except for meat, poultry, and certain egg products for which the Food Safety and Inspection Service (FSIS) of the U.S. Department of Agriculture (USDA) is responsible, FDA is charged with enforcing tolerances in both imported foods and in domestic foods shipped in interstate commerce. FDA also acquires data on particular commodity and pesticide combinations by carrying out market basket surveys under the Total Diet Study. Since 1991, USDA's Agricultural Marketing Service (AMS) has carried out a pesticide residue testing program, called the Pesticide Data Program (PDP), directed at raw agricultural products and various processed foods through contracts with states to perform the sampling and analyses. FSIS and AMS report their pesticide residue data independently. Information about the PDP is available at http://www.ams.usda.gov/science/pdp/index.htm.

Regulatory Monitoring

FDA samples individual lots of domestically produced and imported foods and analyzes them for pesticide residues to enforce the tolerances established by EPA. Domestic samples are typically collected close to the point of production in the distribution system, i.e., growers, packers, and distributors. Import samples are collected at the point of entry into U.S. commerce. Emphasis is on the raw agricultural product, which is typically analyzed as the unwashed, whole (unpeeled), raw commodity. Processed foods are also included. If illegal residues are found at a level above an EPA tolerance or FDA enforcement level, or measurable levels of residues for which EPA has established no tolerance for a given food are found in domestic foods, the lot of food, as available, will be removed from commerce. FDA can also issue Warning Letters to the responsible growers and invoke other sanctions, such as a seizure or injunction, to correct the cause of the violation. For imports, shipments with illegal residues are refused entry into U.S. commerce. "Detention Without Physical Examination" or DWPE (previously called automatic detention) may be invoked for future imported lots of the commodity based on the finding of a single violative shipment. Congress has authorized FDA to refuse admission of regulated articles based on information, other than the results of a direct examination of an entry, that causes an article to appear to violate the Food Drug and Cosmetic Act (FD&C Act). Entries of imported foods suspected of containing illegal pesticide residues from previous examination meet the criteria. DWPE can be applied to product from specific growers, manufacturers, or shippers, or to a geographic area or country if the problem is demonstrated to be sufficiently broad-based. FDA's Import Alerts, available at

http://www.fda.gov/ForIndustry/ImportProgram/ImportAlerts/default.htm, describe current DWPEs for pesticide residues and other food issues. There are currently four Import Alerts that address food products that are under DWPE for pesticides:

- Import Alert # 99-05 "Detention Without Physical Examination of Raw Agricultural Products for Pesticides"
- Import Alert # 99-08 "Detention Without Physical Examination of Processed Foods for Pesticides"
- Import Alert # 99-14 " Countrywide Detention Without Physical Examination of Raw Agricultural Products for Pesticides"
- Import Alert # 99-15 "Countrywide Detention Without Physical Examination of Processed Products for Pesticides"

Growers, manufacturers, and shippers can have their product(s) removed from FDA DWPE by providing evidence establishing that the conditions that gave rise to the appearance of a violation have been resolved and that there is sufficient basis for the Agency to have confidence that future entries will be in compliance of the FD&C Act. A minimum of five consecutive non-violative commercial shipments, as demonstrated by providing FDA with acceptable reports of private lab analyses, can remove a grower's, manufacturer's, or shipper's product from DWPE. Removal of a countrywide or geographic area DWPE would typically require submission to FDA of an effective, detailed approach to correcting the problem, along with acceptable laboratory reports demonstrating compliance of the commodity(ies) in question.

Factors considered by FDA in planning the types and origin of commodities to sample include: analysis of past problem areas; commodity/pesticide findings from recently generated state, USDA, and FDA analyses; available foreign pesticide usage data, regional intelligence on pesticide use; dietary significance of the food; volume of individual commodities of domestic food produced and entered into interstate commerce and of imported food offered for entry into the U.S.; the origin of imported food; and chemical characteristics and toxicity of the pesticide(s) used.

Analytical Methods and Pesticide Coverage

To analyze the large numbers of samples whose pesticide treatment history is usually unknown, FDA uses analytical methods capable of simultaneously determining a number of pesticide residues. These multi-residue methods (MRMs) can determine about half of the approximately 400 pesticides with EPA tolerances, and many others that have no tolerances. The most commonly used MRMs can also detect many metabolites, impurities, and alteration products of pesticides[4] .

Single residue methods (SRMs) or selective MRMs are used to determine some pesticide residues in foods. An SRM usually determines one pesticide; a selective MRM measures a relatively small number of chemically related pesticides. SRMs and selective MRMs are more resource intensive per residue and, therefore, employed more judiciously. A suspicion of a violation or a need to acquire residue data in select commodities will usually trigger use of these methods.

The lower limit of residue measurement in FDA's determination of a specific pesticide is usually well below tolerance levels. Tolerance levels generally range from 0.1 to 50 parts per million (ppm). Residues present at 0.01 ppm and above are usually measurable; however, for individual pesticides, this limit may range from 0.005 to 1 ppm. Trace levels of pesticide residues are also reported. The term "trace" is used to indicate residues that are detected but at levels below the residue's limit of quantitation (LOQ) for the method employed.

FDA conducts ongoing research to update its pesticide monitoring program. This research includes testing the behavior of new or previously untested pesticides through existing analytical methods, as well as development of new methods to improve efficiencies and detection capabilities. In recent years, newer extraction procedures and detection techniques have increasingly replaced older methods, and are allowing for a greater level of pesticide coverage. As a result, the number of pesticides recorded in Table 3 in the yearly report as detectable in any single year will vary. Table 3 reflects the residues: (1) for which FDA has performed appropriate method validation to confirm the residue is adequately recovered in a variety of foods; or (2) that were detected in an FDA sample that year, but for which their recoveries may not have been appropriately validated. The latter can occur when unusual residue responses are detected and identified. Regarding criterion (2), a residue detected one year does not re-appear in Table 3 in succeeding years unless it is detected again, or the appropriate validation has subsequently been performed. The recovery of such pesticides is not assumed across a variety of foods until validated.

FDA/State Cooperation

FDA field offices interact with their counterparts in many states to enhance the effectiveness of the Agency's pesticide monitoring program. Memoranda of Understanding and Partnership Agreements have been established between FDA and many state agencies. These agreements provide for more efficient residue monitoring by both parties by coordinating efforts, broadening coverage, and eliminating duplication of effort. There are agreements for data sharing, joint planning, and state collection of samples for FDA examination. FDA and some states also share responsibilites for collection, analysis, and enforcement follow-up for individual commodities or products of particular origin (i.e., imported vs. domestic products).

Animal Feeds

In addition to monitoring foods for human consumption, FDA also samples and analyzes domestic and imported animal feeds for pesticide residues. FDA's Center for Veterinary Medicine (CVM) directs this portion of the Agency's monitoring via its Feed Contaminants Compliance Program. Although animal feeds containing violative pesticide residues may present a potential hazard to a number of different categories of animals (e.g., laboratory animals, pets, wildlife, etc.), CVM's monitoring focuses on feeds for livestock and poultry - animals that ultimately become or produce foods for human consumption.

International Activities

FDA pesticide residue monitoring activities are a part of the Agency's overall food safety programs. As such, they are subject to the responsibilities FDA has under international trade agreements to which the United States is signatory. The arrangements FDA makes with other countries with respect to food safety programs, and the activities that FDA carries out internationally with respect to food safety, can also affect how some of our monitoring is conducted.

FDA, as a part of the U.S. Government, is subject to the obligations placed on countries by the World Trade Organization's Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement). Pesticide residue tolerances and monitoring activities are included as sanitary measures under the SPS Agreement. FDA's obligations under this Agreement include the requirement that standards are based on an assessment appropriate to the circumstances of the risk to human and animal health, and on international standards except when a more stringent standard can be scientifically supported. The standards must also be applied equally to domestic and imported products unless there is scientifically based justification for doing otherwise.

Similarly, FDA, as part of the U.S. Government, is subject to obligations arising from several Free Trade Agreements, the most notable of which is the North America Free Trade Agreement (NAFTA). These bilateral or multilateral Free Trade Agreements contain provisions on sanitary measures that are consistent with the provisions of the WTO SPS Agreement. As with the SPS Agreement, the sanitary provisions of these agreements include provisions relating to pesticide residues.

FDA maintains a number of arrangements with counterpart agencies in foreign governments. Such arrangements include Memoranda of Understanding, Confidentiality Agreements, and Exchanges of Letters. These arrangements most often contain information-sharing provisions that include the ability to share analytical findings about pesticide residues. Several of the MOUs have specific provisions relating to pesticide residue information sharing or cooperative efforts

relating to pesticide residues.

FDA also participates in meetings with counterpart food safety agencies of foreign governments. For example, FDA participates in the work of the Quadrilateral Discussions on Food Safety comprised of senior food safety officials from Australia, Canada, New Zealand, and the United States. FDA also carries out bilateral discussions on food safety with several countries, including Canada and Mexico, and meets regularly with the European Commission. Pesticide control programs and pesticide residue issues can be subjects for discussion at these meetings.

FDA participates in the work of international standards-setting organizations, particularly the work of the Codex Alimentarius Commission (Codex). Within Codex, FDA is an active participant in the work of the Codex Committee on Pesticide Residues.

Focused Sampling

FDA's pesticide monitoring program frequently includes what this report describes as "focused sampling." This approach is primarily regulatory in nature, with the necessary protocols followed to ensure enforcement action can be pursued if a violation is detected. Focused sampling is generally used to follow-up on suspected problem areas or to acquire residue data on select commodities not usually covered during regulatory monitoring. Focused sampling is carried out by short-term field assignments that require collection of specific commodities to be analyzed for the general classes of pesticide residues (e.g., organochlorine and organophosphate), or individual or unique classes of residues of interest.

Focused sampling differs from what was previously described in FDA's pesticide program as incidence and level monitoring. Incidence and level monitoring to obtain pesticide residue data was generally non-regulatory analyses of selected samples of commodities of interest, which at times was statistically based. Incidence and level monitoring typically required a follow-up collection and analysis of a regulatory sample to confirm a violation before an FDA enforcement action could ensue. However, due to resource constraints, incidence and level monitoring as done in the past by FDA has been replaced by focused sampling, except as considered below as part of FDA's Total Diet Study program.

FDA Total Diet Study

The Total Diet Study (TDS) is distinct from regulatory monitoring in that it determines pesticide residues not in the raw commodity, but in foods that are prepared table-ready for consumption [5]. The sampled foods are washed, peeled, and/or cooked before analysis, simulating typical consumer handling.

TDS foods are sampled as “market baskets,” with each market basket comprising samples of about 300 different foods that represent the average U.S. consumer’s diet. Four regional market baskets are planned for each year and for each market basket samples are collected in three different cities within the region. The three samples of each food are combined to form a single composite prior to analysis. In addition to being analyzed for pesticide residues, TDS foods are also selectively analyzed for toxic and nutrient elements, industrial chemicals, and other chemical contaminants. Additional information about the history and design of the TDS as well as analytical results can be found in several FDA publications [5,6,7,8,9,10,11] and on CFSAN’s website at http://www.fda.gov/Food/FoodSafety/FoodContaminantsAdulteration/TotalDietStudy/default.htm..

Another distinction from FDA’s pesticide residue regulatory monitoring is that the TDS foods are analyzed using methods that are modified to permit enhanced measurement of residues, generally at levels up to 10-100 times more sensitive than regulatory monitoring procedures. TDS residue levels as low as 0.1 part per billion are routinely reported.

The TDS program is not regulatory in nature but considered incidence and level monitoring. However, when results are found that indicate a food contains a pesticide residue with no tolerance, or exceeds an existing tolerance or enforcement level, an investigation into the cause of the illegal residue will typically ensue. The investigation will be conducted of the responsible manufacturer or grower for a domestic food. For foods of foreign origin, the investigation can involve the importer and foreign grower and manufacturer. The investigation may include subsequent regulatory sampling and analysis of the food or suspect ingredients.

FDA Pesticide Program Sampling Design

The goal of FDA’s pesticide monitoring program is to carry out selective monitoring to achieve an adequate level of consumer protection. Most of the FDA samples are of the surveillance type; that is, there is no specific prior knowledge or evidence that a particular food shipment contains illegal residues. However, FDA’s monitoring is not random because some bias is introduced primarily by emphasizing sampling of commodities and places of origin with a past history of violations, and to a lesser extent emphasizing larger-sized shipments.

For fiscal year 2008, the import violation rate was 4.7% and the domestic violation rate was 0.9%. The FY 2008 violation rates are in-line with annual violation rates over the past dozen years which have ranged between 0.7% and 2.4% for domestic foods, and between 2.6% and 6.2% for imports.

In FY 1991, FDA contracted with the Research Triangle Institute (RTI) to design a statistical approach to conduct a residue study. The resulting report was

entitled “Monitoring Pesticide Residues in Fresh Produce: A Probabilistic Approach.” The report acknowledged that FDA’s then current program (which was similar to FDA’s current program except that sample totals were two to three times higher) was not a probability-based approach since it was not free of selection bias. A probabilistic approach described in the report would need to account for, among other elements, a high degree of consumption coverage (coverage of a significant portion of the commodity population), and seasonal and geographical representation. Also, to achieve a meaningful certainty level of confidence of about 95%, 800 data points (samples) of each import or domestic commodity would be necessary.

In FY 1992-1994 FDA conducted “statistically-based” studies of four commodities[1,2], adhering to as many of the tenets of the RTI report as was practical within available resources. The commodities tested were apples, pears, rice, and tomatoes. Domestically grown and imported products were separately tested. The conclusions of the studies corroborated the premise that when compared to a statistically-based study, FDA’s monitoring program provides a reasonably reliable estimate of pesticide residues in the U.S. food supply, especially when the data are viewed over many years; and that the levels of residues found are generally well below U.S. tolerances. FDA maintains this premise, but does not infer statistical significance to its results for any particular imported or domestic commodity within a fiscal year due to sampling bias and sampling levels which can vary significantly from year to year.

It should be noted that these studies were very expensive for FDA to conduct. For example, total costs exceeded 1 million dollars (in 1993-1994 dollars) for the import apple study and also for the domestic apple study. Costs included FDA personnel time, equipment and supplies.

An important complement to FDA’s pesticide program is its Total Diet Study Program previously discussed in this report. By its design, the TDS serves as an early warning system, capable of detecting many more pesticide residues and at much greater sensitivity when compared to FDA’s regulatory program. (FDA’s regulatory program is designed to detect residues in violation of EPA tolerances).

Considering the above and coupled with available Agency resources, FDA has to date not attempted to develop a monitoring program that would be statistically based. FDA is willing to investigate whether such a program might be developed and implemented in a cost-effective manner. However, it is FDA's opinion that the current sampling levels, coupled with broad-based enforcement strategies for imports, are sufficient for FDA to achieve the program's main objective, i.e., adequate consumer protection by selective enforcement. Import enforcement strategies that are available to the Agency are “Detention Without Physical Examination” (DWPE) for future entries of commodity/grower combinations that are found in violation of U.S pesticide tolerances, and country-wide DWPE of particular commodities if the violations are numerous and from multiple growers.

Once a problem is identified, FDA can achieve broad enforcement by employing these strategies and detaining at their entry points the suspect imported foods as they would exhibit the appearance of a violation. This procedure places the burden of demonstrating product compliance with U.S. residue tolerances on the importer before the entry can be released into domestic commerce.

Identification of Imports (Products or Countries) Requiring Special Attention or Additional Studies

Addressing Products and Countries that Warrant Special Attention:

Addressing products and countries that warrant special attention is best carried out by providing specific guidance (e.g., increased surveillance, focused sampling by means of field assignments) to the Agency field offices and laboratories under FDA's "Pesticides and Industrial Chemicals in Domestic and Imported Foods Compliance Program." FDA's sampling strategy of focusing on products that have a history of recurring violations will continue to be applied to future program coverage. Though specifics are provided in this report regarding import commodities and countries of origin that, based on FY 2008 data, may warrant special attention, FDA's sampling guidance provided to its field districts is typically based on multi-year data. FDA also utilizes available foreign pesticide usage data and data from USDA's Pesticide Data Program in developing sampling guidance. However, meaningful violative episodes that do occur are addressed in real time as much as possible through use of the Import Alert system or enhanced sampling.

When attempting to compare FDA's import pesticide residue data against its domestic data, by product or by country, several factors need to be kept in mind:

- The import violation rate has typically been three to four times that of domestic foods. Based on FY 2008 data, the import sample violation rate was about five times that of domestic foods, 4.7% compared to 0.9%. It is not unexpected that many imported food products in this or previous reports have a violation rate exceeding that of their domestic counterparts, or for many foreign countries to have a violation rate exceeding that of the U.S.

- The data analysis by commodity in this report was compiled by FDA product code (i.e., distinct commodities). For FY 2008, 647 different import food commodities and 204 different domestic food commodities were tested.

- FDA's pesticide residue monitoring program should not be viewed as random or statistical, rather it is influenced towards products and countries of origin that have a history of violations or are suspected of violations based on available intelligence.

Review by Commodity:

Considering the above factors, the following criteria were applied to the FY 2008 data to select import commodities that may warrant special attention:

- commodities with at least 20 samples analyzed or at least 3 violations, and
- a violation rate of 10% or higher.

The following table lists the import commodities that meet the criteria. The commodities are sorted by violation rate and include the total number of samples analyzed for FY 2008. Commodities reported under non-specific product codes (e.g., leaf and stem vegetables, not elsewhere classified) were excluded.

Table 1 – Import Commodities That May Warrant Special Attention Based on FY 2008 Sampling Results

Commodity	No. Samples Analyzed	Violation Rate (%)
Kava kava	7	57.1
Capsicums	10	50.0
Basil	8	50.0
Ginseng, herbal and botanical, other than tea*	29	37.9
Pepinos (tropical fruit)	14	28.6
Papaya *	20	25.0
Tea, green	26	23.0
Pepper, hot, dried or paste	37	16.2
Stringbeans	86	10.5

* Indicates commodity was on the FY 2007 table of import commodities warranting special attention.

Review by Country of Origin:

Table 2 below lists countries of origin with a minimum of 50 samples analyzed and a 7% or greater violation rate for FY 2008.

Table 2 – Countries of Origin That May Warrant Special Attention Based on FY 2008 Sampling Results

Country	No. Samples Analyzed	Violation Rate (%)
Taiwan	50	14.0
Guatemala *	100	9.0
Ecuador *	63	7.7

* Indicates country was listed on the FY 2007 table of countries of origin warranting special attention.

Samples from Mexico continue to comprise the greatest portion of FDA's import pesticide sampling. In FY 2008, 1041 samples from Mexico were analyzed. The violation rate for Mexican samples was 3.7%, somewhat below the 4.7% average for all import samples. Continued high coverage of Mexican foods is warranted due to the large volume of foods exported to the U.S. from Mexico. Additionally, 570 samples from China (mainland) were analyzed. The violation rate for samples from China was 6.3%. Continued high coverage of foods from China is also warranted based both on import volume and a higher than average violation rate (above the overall import violation rate).

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The database containing the FY 2008 data from which this report was derived is available from FDA's website, at http://www.fda.gov/Food/FoodSafety/FoodContaminantsAdulteration/Pesticides/ResidueMonitoringReports/default.htm. The 1996 through 2007 reports and databases are also available on the website. FDA pesticide monitoring data collected under the regulatory monitoring approach in 1992, 1993, 1994, and 1995 are available for purchase on personal computer diskettes from the National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, VA 22161 (telephone 1-800-553-6847); or from NTIS' website at http://www.ntis.gov. Order numbers are: 1992, PB94-500899; 1993, PB94-501681; 1994, PB95-503132; and 1995, PB96-503156.

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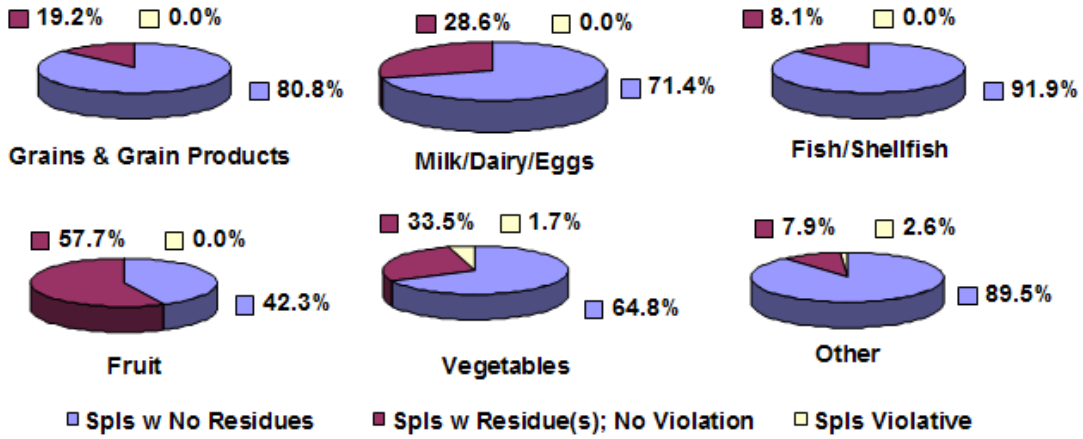
Results and Discussion – FY 2008

Regulatory Monitoring

Under regulatory monitoring, 5,053 samples were analyzed. Of these, 1,398 were domestic foods and 3,655 were imported foods.

Figure 1 shows the percentage of the 1,398 domestic samples by commodity group with “No Residues Found,” “Residues Found; No Violation,” and ”Violative” (a violative residue is defined in this report as a residue which exceeds an EPA tolerance or FDA enforcement level, or a residue at a level of regulatory significance for which no tolerance has been established in the sampled food.)

Figure 1 - Results of Domestic Samples by Commodity Group for FY 2008
Group Sample Totals: Grains & Grain Products, 245; Milk/Dairy/Eggs, 7; Fish/Shellfish, 62; Fruit, 333; Vegetables, 713; Other Foods, 38.



As in earlier years, fruits and vegetables accounted for the largest proportion of the domestic commodities analyzed in FY 2008; these two commodity groups comprised 74.8 % of the total number of domestic samples. In FY 2008, 99.1 % of all domestic foods analyzed by FDA were in compliance with EPA’s established residue tolerances and FDA formal enforcement levels. The compliance rate for domestic foods for FYs 1996 to 2007 was between 97.6% and 99.3%.

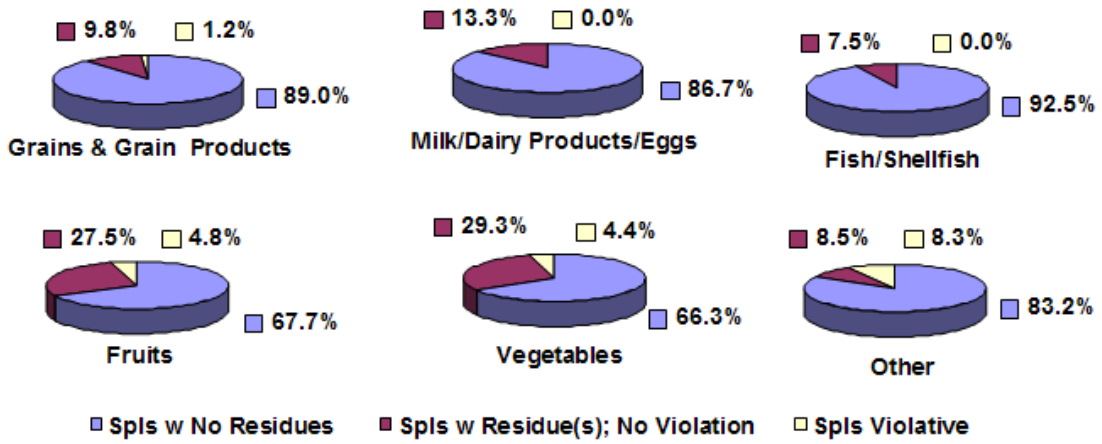
Appendix A contains more detailed data on domestic monitoring findings by commodity, including the total number of samples analyzed, the percent samples with no residues detected, and the percent violative samples including the nature of the violation (over-tolerance vs. no tolerance). Of the 1,398 domestic samples, 64.2 % had no detectable residues and 0.9 % had violative residues. In the largest commodity groups, fruits and vegetables, 42.3 % and 64.8 % of the samples, respectively, had no residues detected;

no fruit samples and just 1.7 % of the vegetable samples contained violative residues (Figure 1). In the grains and grain products group, 80.8 % of the samples had no residues detected, and there were no samples with violative residues. In the fish/shellfish/other aquatic products group, 91.9 % had no detectable residues and there were no samples with violative residues. In the milk/dairy products/eggs group seven samples were analyzed and five had no detectable residues (71.4 %), and no samples had violative residues. In the "Other" foods group that covers nuts, seeds, and snack foods among other foods, 89.5 % of the 38 samples analyzed had no detectable residues, and there was one sample with violative residues (2.6 %).

Findings by commodity group for the 3,655 import samples are shown in Figure 2. Fruits and vegetables accounted for 71.4 % of import samples. Overall for all imported foods, 95.3 % of the samples analyzed in FY 2008 were in compliance with EPA tolerances and FDA enforcement levels. This compares with a compliance rate for imported foods for FYs 1996 to 2007 of 93.8 % to 98.4 %.

Appendix B contains detailed data on import samples. Of the 3,655 import samples analyzed, 72.3 % had no residues detected, while 4.7 % had violative residues. Imported fruits had 67.7 % of samples with no residues detected and 4.8 % samples with violative residues. Imported vegetables had 66.3 % of samples with no residues detected and 4.4 % samples with violative residues. No residues were found in 86.7 % of samples of the imported milk/dairy products/eggs group and no violations were detected. No residues were found in 92.5 % of the imported fish/shellfish group and no violations were found in this food group. In the imported grains and grain products group, 89.0 % had no detectable residues, and two samples (1.2 %) contained violative residues. In the "Other" foods group consisting largely of nuts, seeds, oils, honey, candy, spices, multiple food products, and dietary supplements, 83.2 % of the samples analyzed had no residues detected, while 8.3 % of the samples (mostly dietary supplements and spices) contained violative residues.

Figure 2 - Results of Import Samples by Commodity Group FY 2008
Group Sample Totals: Grains & Grain Products, 164; Milk/Dairy/Eggs, 30; Fish/Shellfish, 226; Fruit, 771; Vegetables, 1839; Other Foods, 625.



Pesticide monitoring data collected under FDA's regulatory monitoring approach in FY 2008 are available to the public as a computer database. This database summarizes FDA 2008 regulatory monitoring coverage and findings by country/commodity/pesticide combination. The database also includes monitoring data by individual sample from which the summary information was compiled. Information on how to obtain this database as well as those for 1992-2007 is provided in the “Acknowledgements” section of this report.

Geographic Coverage

Domestic: A total of 1,398 domestic samples were collected in FY 2008 from 41 states, Puerto Rico, and the District of Columbia. Table 1 lists the number of domestic samples from each state, in descending order.

Table 1. Domestic Samples Collected and Analyzed by State Origin in 2008

State	Total Samples Collected and Analyzed
Alaska	6
Arizona	82
California	119
Colorado	9
Connecticut	1
Delaware	1
Florida	59
Georgia	12
Hawaii	4
Idaho	45

Illinois	47
Indiana	25
Iowa	18
Kansas	15
Kentucky	5
Louisiana	90
Maine	5
Maryland	4
Massachusetts	11
Michigan	80
Minnesota	145
Missouri	51
Montana	21
New Hampshire	3
New Jersey	5
New York	74
North Carolina	12
North Dakota	30
Ohio	25
Oregon	118
Pennsylvania	28
Rhode Island	2
South Carolina	7
South Dakota	5
Tennessee	1
Texas	3
Vermont	2
Virginia	83
Washington	122
Wisconsin	21

District of Columbia and Puerto Rico – 1 sample each. States of Alabama, Arkansas, Mississippi, Nebraska, New Mexico, Nevada, Oklahoma, Utah, West Virginia, Wyoming – no samples collected.

Note – for Table 1, 90 domestic samples with no state recorded in “Sample 2008” file were attributed through other data as: Oregon 39; Idaho 30; California 6; Washington 5; Pennsylvania 4; Georgia, Illinois, Michigan, Minnesota, Missouri, and Virginia 1 each. These counts were added to Table 1.

Imports: A total of 3,655 samples representing food shipments from 93 countries (excluding U.S. goods sampled in import status) were collected in FY 2008. Table 2 lists the number of samples collected from each country. Mexico, as in the past, was the source of the largest number of samples, reflecting the

volume and diversity of commodities imported from that country, especially during the winter months. Table 2A lists the countries of origin that had ten or fewer samples collected in FY 2008.

Table 2. Foreign Countries and Number of Samples Collected and Analyzed in 2008

Country	Samples Collected and Analyzed
Argentina	36
Belgium	18
Brazil	14
Canada	363
Chile	111
China, Peoples Rep.	570
Colombia	31
Costa Rica	23
Dominican Republic	78
Ecuador	63
Egypt	45
El Salvador	18
France	15
Greece	28
Guatemala	100
Honduras	26
India	181
Indonesia	18
Iran	12
Israel	16
Jamaica	17
Japan	15
Korea, Rep of (South)	41
Lebanon	14
Mexico	1041
Netherlands	13
Pakistan	16
Peru	95
Philippines	15
Poland	33
Romania	11
Russia	11
South Africa	19
Spain	23
Taiwan	50
Thailand	106
Turkey	41

United Arab Emirates	19
Unspecified *	81
Vietnam	40

Note: Unspecified samples consisted primarily of foods reported sampled in import status but of U.S origin, including U.S. Goods Returned (U.S. products originally exported and subsequently returned).

Table 2A - Ten or Fewer Samples Collected and Analyzed in FY 2008 From the Following Countries

Countries	Countries (cont'd)
Afghanistan	Morocco
Algeria	Mozambique
Aruba	Namibia
Australia	New Caledonia
Austria	New Zealand
Bangladesh	Nicaragua
Belize	Nigeria
Bolivia	Norway
Bulgaria	Panama
Denmark	Paraguay
Ethopia	Portugal
Fiji	Saudi Arabia
Germany	Serbia
Haiti	Singapore
Hong Kong	Sri Lanka
Hungary	Syrian Arab Republic
Iraq	Togo
Ireland	Trinidad & Tobago
Ivory Coast	Tunsia
Jordan	Turkmenistan
Kampuchea	Ukraine
Kenya	United Kingdom
Lithuania	Uruguay
Macedonia	Uzbekistan
Madagascar	Vanuatu
Malawi	West Bank
Malaysia	

Domestic/Import Violation Rate Comparison for FY 2008

In FY 2008, 1,398 domestic and 3,655 import samples were collected and analyzed. Pesticide residues were detected in 35.8 % of the domestic samples and in 27.7 % of the import samples. Violative residues were found in 0.9 % of the domestic samples and
4.7 % of the import samples. Among grains and grain products, the violation rate was zero for domestic samples and 1.2 % for imports. No violations were found

in the milk/dairy products/eggs group or the fish/shellfish/other aquatic products/aquaculture seafood group for either domestic or import samples. Although no domestic fruit samples contained violative residues, 4.8 % of imports did. For vegetables, 1.7 % of domestic samples and 4.4 % of import samples contained violative residues. In the category "Other" (mostly nuts, seeds, oils, honey, candy, spices, multiple food products, and dietary supplements), the violation rates for domestic and import samples were 2.6 % and 8.3 %, respectively. Imported dietary supplements, particularly ginseng, accounted for most of the samples with violative residues for the Import "Other" foods group.

Of the domestic violative samples, all 13 violations were for pesticide residues for which no EPA tolerance or FDA enforcement level exists for the food commodity (i.e., a "no-tolerance" violation). Of the 171 import violative samples, 147 or 86.0 %, were for "no-tolerance" residue violations. Twenty-four of the import violative samples (14.0 %), were for samples found to contain residues over an established EPA tolerance or FDA enforcement level (i.e., an "over-tolerance" violation). Eleven of the import samples with an "over-tolerance" violation also contained one or more "no-tolerance" violations (these samples were counted as an "over-tolerance" violation in Appendix B). FDA enforcement actions for products found in violation of EPA tolerances are described in the "Regulatory Monitoring" section of this report.

Pesticide Coverage

Table 3 lists the 473 pesticides that were detectable or found by the methods used in FY 2008; each of the 161 pesticides that were actually found is indicated by an asterisk (*). Residues not previously looked for or detected, are noted by a "**+**".

Table 3 - Pesticides Detectable and Found (*) by Methods Used in 2008 Regulatory Monitoring[1,2,3]

Pesticides	Pesticides (cont'd)	Pesticides (cont'd)
(E)-AZOXYSTROBIN *	1,2,3,4,6,7,8-HEPTACHLORODIBENZO FURAN *	1,2,3,5-TETRACHLORO BENZENE
1,2,4-TRIAZOLE	2-(DIETHYLAMINO)-6-METHYL-4-(1H) PYRIMIDINONE * **+**	2,3,5,6-TETRACHLORO ANILINE *
2,4-D ETHYLHEXYL ESTER * **+**	2,4-DICHLORO-6-NITROBENZENEAMINE	2,6-DICHLOROBENZAMIDE
2,6-DIPN *	2-CHLOROETHYL CAPRATE **+**	2-CHLOROETHYL LAURATE **+**
2-METHOXY-3,5,6-TRICHLOROPYRIDINE	2-METHYLNAPTHALENE * **+**	3-METHYL-4-NITROPHENOL
4-(DICHLOROACETYL)-1-OXA-4-AZAPIRO 4.5 D	4-(PHENYLAMINO)PHENOL	4-CYCLOHEXENE-1,2-DICARBOXIMIDE, CIS- *

5-CHLORO-3-METHYL-4-NITRO-1H-PYRAZOLE	6-BENZYLADENINE	ACEPHATE *
ACETAMIPRID *	ACETOCHLOR	ACIBENZOLAR-S-METHYL
ACRINATHRIN	ALACHLOR	ALDICARB (TOTAL) *
ALDRIN	ALLETHRIN	ALPHA CYPERMETHRIN
AMETRYN	AMINOCARB	AMITRAZ *
ANILAZINE	ARAMITE	ATRAZINE *
AZAFENIDIN **+**	AZINPHOS-ETHYL	AZINPHOS-METHYL (TOTAL) *
AZOXYSTROBIN *	BENALAXYL *	BENDIOCARB *
BENFLURALIN (BENEFIN)	BENODANIL	BENOXACOR
BENSULIDE	BENZOYLPROP ETHYL	BF 490-1
BF 490-2	BF 490-9	BHC (TOTAL) *
BIFENAZATE *	BIFENOX	BIFENTHRIN *
BINAPACRYL	BIPHENYL *	BITERTANOL *
BOSCALID *	BPMC * **+**	BROMACIL
BROMOPHOS	BROMOPHOS-ETHYL	BROMOPROPYLATE *
BROMUCONAZOLE	BUFENCARB	BULAN
BUPIRIMATE	BUPROFEZIN *	BUTACHLOR
BUTRALIN	BUTYLATE	CADUSAFOS
CAPTAFOL	CAPTAN *****	CARBARYL *
CARBETAMIDE	CARBOFURAN (TOTAL) *	CARBOPHENOTHION (TOTAL)
CARBOPHENOTHION OXYGEN ANALOG SULFONE	CARBOPHENOTHION SULFOXIDE	CARBOSULFAN
CARBOTHENOTHION OXYGEN ANALOG	CARBOXIN	CARFENTRAZONE ETHYL ESTER
CGA 14128	CGA 150829	CGA-232449
CHLORBENSIDE	CHLORBROMURON	CHLORBUFAM
CHLORDANE (TOTAL) *	CHLORDECONE	CHLORDIMEFORM
CHLORETHOXYFOS	CHLORFENAPYR	CHLORFENVINPHOS (TOTAL)
CHLORFLURECOL METHYL ESTER	CHLORMEPHOS	CHLORNITROFEN
CHLOROBENZILATE	CHLORONEB	CHLOROPROPYLATE
CHLOROTHALONIL *	CHLOROXURON	CHLORPROPHAM *
CHLORPYRIFOS *	CHLORPYRIFOS METHYL *	CHLORPYRIFOS OXYGEN ANALOG
CHLORTHIOPHOS	CHLORTHIOPHOS OXYGEN ANALOG	CHLORTHIOPHOS SULFONE
CHLORTHIOPHOS SULFOXIDE	CIS-DIMETHOMORPH *	CLODINAFOP-PROPARGYL
CLOMAZONE	CLOQUINTOCET-MEXYL	COUMAPHOS
COUMAPHOS OXYGEN	CP 51214	CROTOXYPHOS

ANALOG		
CRUFOMATE	CYANAZINE	CYANOFENPHOS
CYANOPHOS	CYCLOATE *	CYCLURON
CYFLUTHRIN	CYHALOFOP BUTYL ESTER	CYMOXANIL
CYPERMETHRIN *	CYPRAZINE	CYPROCONAZOLE *
CYPRODINIL *	DCPA *	DDT (TOTAL) *
DEF	DELTAMETHRIN *	DELTAMETHRIN, TRANS-
DEMETON-O (TOTAL)	DEMETON-S	DEMETON-S SULFONE
DEMETON-S SULFOXIDE	DES N-ISOPROPYL ISOFENPHOS	DESDIETHYL SIMAZINE
DESETHYLTERBUTHYLAZINE	DES-ISOPROPYL IPRODIONE	DESMETHYL DIPHENAMID
DESMETRYN	DIALIFOR	DIALLATE
DIAZINON *	DIAZINON OXYGEN ANALOG	DICHLOBENIL
DICHLOFENTHION	DICHLOFLUANID	DICHLONE
DICHLORVOS *	DICLOBUTRAZOL	DICLOFOP-METHYL
DICLORAN *	DICOFOL (TOTAL) *	DICROTOPHOS
DIELDRIN (TOTAL) *	DIETHATYL-ETHYL	DIETHOFENCARB *
DIFENOCONAZOLE *	DILAN	DIMETHACHLOR
DIMETHAMETRYN	DIMETHIPIN	DIMETHOATE *
DIMETHOMORPH *	DINITRAMINE	DINOBUTON
DINOCAP	DIOXACARB	DIOXATHION *
DIPHENAMID *	DIPHENYL 2-ETHYLHEXYL PHOSPHATE +	DIPHENYLAMINE *
DISULFOTON	DISULFOTON SULFONE	DISULFOTON SULFOXIDE
DPX-MP062	EDIFENPHOS	ENDOSULFAN (TOTAL) *
ENDRIN (TOTAL)	EPN *	EPOXICONAZOLE
EPTC	ESFENVALERATE *	ETACONAZOLE
ETHALFLURALIN	ETHEPHON	ETHIOFENCARB
ETHIOLATE	ETHION *	ETHION OXYGEN ANALOG
ETHOFUMESATE	ETHOPROP	ETHOXYQUIN *
ETOFENPROX *	ETOXAZOLE *	ETRIDIAZOLE *
ETRIMFOS	ETRIMFOS OXYGEN ANALOG	FAMOXADONE *
FAMPHUR (TOTAL)	FENAMIDONE *	FENAMIPHOS (TOTAL) *
FENARIMOL *	FENAZAQUIN *	FENBUCONAZOLE *
FENBUCONAZOLE METABOLITES (TOTAL)	FENFURAM	FENHEXAMID *
FENITROTHION	FENITROTHION OXYGEN ANALOG	FENOXAPROP-ETHYL
FENOXYCARB	FENPROPATHRIN *	FENPROPIMORPH
FENSULFOTHION (TOTAL)	FENTHION (TOTAL)	FENVALERATE *
FIPRONIL	FLAMPROP-METHYL	FLAMPROP-M-ISOPROPYL

FLUAZIFOP BUTYL ESTER	FLUAZINAM	FLUCHLORALIN
FLUCYTHRINAPE (PAYOFF)	FLUDIOXONIL *	FLUQUINCONAZOLE *
FLUROXYPYR **+**	FLUSILAZOLE *	FLUTOLANIL *
FLUVALINATE *	FOE 5043 (FLUFENACET)	FOLPET *
FONOFOS	FONOFOS OXYGEN ANALOG	FORMOTHION
FOSTHIAZATE (TOTAL)	FUBERIDAZOLE	FURILAZOLE
GARDONA (TETRACHLORVINPHOS)	HALOZYFOP-METHYL **+**	HEPTACHLOR (TOTAL) *
HEPTENOPHOS	HEXACHLOROBENZENE *	HEXACONAZOLE *
HEXAZINONE	HEXYTHIAZOX	IBP *
IMAZALIL *	IMAZAMETHABENZ METHYL ESTER	IN-B2838
IPRODIONE *	IPRODIONE METABOLITE ISOMER	ISAZOFOS
ISOCARBAMID	ISOFENPHOS	ISOFENPHOS OXYGEN ANALOG
ISOPROCARB	ISOPROPALIN	ISOPROPYL(3-CHLORO-4-METHOXYPHENYL) **+**
ISOPROTHIOLANE *	ISOXABEN	KRESOXIM-METHYL
LACTOFEN (TOTAL)	LAMBDA-CYHALOTHRIN *	LENACIL
LEPTOPHOS	LEPTOPHOS OXYGEN ANALOG	LEPTOPHOS PHOTOPRODUCT
LINDANE *	LINURON *	LUFENURON *
MALATHION *	MALATHION OXYGEN ANALOG	MB 46513
MB45950	MB 46136	MECARBAM
MEPHOSFOLAN	MERPHOS	METAFLUMIZONE
METALAXYL (TOTAL) *	METALDEHYDE	METASYSTOX THIOL
METAZACHLOR	METHABENZTHIAZURON	METHAMIDOPHOS *
METHIDATHION *	METHIOCARB *	METHOMYL
METHOPROTRYNE	METHOXYCHLOR (TOTAL) *	METOBROMURON
METOLACHLOR *	METOLCARB	METRIBUZIN (TOTAL)
MEVINPHOS (TOTAL)	MGK 264 *	MIREX (TOTAL) *
MOLINATE	MONOCROTOPHOS *	MONOLINURON
MYCLOBUTANIL *	N, N-DIALLYL DICHLOROACETAMIDE	NALED
NAPROPAMIDE	N-DESMETHYL FLUCARBAZONE	NITRALIN
NITRAPYRIN	NITROFEN	NITROFLUORFEN
NITROTHAL-ISOPROPYL	NOREA	NORFLURAZON (TOTAL)
NOVALURON *	NUARIMOL	OCTHILINONE
OFURACE	OMETHOATE *	OVEX

OXADIAZON	OXADIXYL *	OXAMYL *
OXAMYL OXIME METABOLITE	OXYDEMETON-METHYL (TOTAL) *	OXYFLUORFEN
OXYTHIOQUINOX	PACLOBUTRAZOL	PARATHION
PARATHION OXYGEN ANALOG	PARATHION-METHYL *	PARATHION-METHYL OXYGEN ANALOG
PB-9	PEBULATE	PENCONAZOLE *
PENDIMETHALIN *	PENTACHLOROBENZENE *	PENTACHLOROBENZO NITRILE *
PENTACHLOROPHENYL METHYL ETHER	PERMETHRIN (TOTAL) *	PERTHANE
PHENMEDIPHAM	PHENOTHRIN *	PHENTHOATE *
PHENYLPHENOL, O- *	PHORATE *	PHORATE METABOLITES (TOTAL) *
PHOSALONE *	PHOSALONE OXYGEN ANALOG	PHOSMET *
PHOSMET OXYGEN ANALOG	PHOSPHAMIDON	PHOXIM OXYGEN ANALOG
PIPERONYL BUTOXIDE *	PIPEROPHOS	PIRIMICARB
PIRIMIPHOS-ETHYL	PIRIMIPHOS-ETHYL OXYGEN ANALOG	PIRIMIPHOS-METHYL *
PRETILACHLOR	PROCHLORAZ *	PROCYAZINE
PROCYMIDONE *	PROFENOFOS *	PROFLURALIN
PROLAN	PROMECARB	PROMETON
PROMETRYN *	PRONAMIDE *	PROPACHLOR
PROPANIL *	PROPARGITE *	PROPAZINE
PROPETAMPHOS	PROPHAM	PROPICONAZOLE (TOTAL) *
PROPOXUR *	PROTHIOFOS	PROTHOATE
PYRACARBOLID	PYRACLOSTROBIN *	PYRAZON
PYRAZOPHOS(AFUGAN)	PYRETHRINS	PYRIDABEN *
PYRIDAPHENTHION *	PYRIMETHANIL *	PYRIMIDINOL (DIAZINON HYDROLYSIS PRODUCT
PYRIPROXYFEN *	QUINALPHOS *	QUINOXYFEN *
QUINTOZENE (TOTAL) *	QUIZALOFOP ETHYL ESTER	RONNEL
RONNEL OXYGEN ANALOG	RPA 405862 *	RPA 408056
RPA 717879	SALITHION	SCHRADAN
SETHOXYDIM +	SIMAZINE *	SIMETRYNE
SPIRODICLOFEN *	STROBANE	SULFALLATE
SULFOTEPP *	SULPHENONE	SULPROFOS (TOTAL)
TCMTB	TEBUCONAZOLE *	TEBUPRIMIFOS
TEBUTHIURON	TECNAZENE (TOTAL) *	TEFLUTHRIN
TEPP	TERBACIL	TERBUFOS (TOTAL)
TERBUMETON	TERBUTHYLAZINE *	TERBUTRYN

TETRACONAZOLE *	TETRADIFON *	TETRAIODOETHYLENE
TETRAMETHRIN *	TETRASUL	THIABENDAZOLE *
THIACLOPRID	THIAMETHOXAM	THIAZOPYR
THIOBENCARB	THIOMETON	THIONAZIN
TOLYLFLUANID	TOXAPHENE	TRALOXYDIM
TRALOMETHRIN	TRANID	TRANS-DIMETHOMORPH *
TRI(2-ETHYLHEXYL) PHOSPHATE * **+**	TRIADIMEFON (TOTAL) *	TRIADIMENOL *
TRI-ALLATE	TRIAZAMATE	TRIAZOPHOS *
TRICHLORFON	TRICYCLAZOLE *	TRIDIPHANE
TRIETAZINE	TRIFLOXYSTROBIN *	TRIFLUMIZOLE *
TRIFLURALIN *	TRIFLUSULFURON METHYL ESTER	TRIMETHACARB (LANDRIN)
TRIMETHACARB (TOTAL)	TRIPHENYL PHOSPHATE *	TRIS(1,3-DICHLORO-2-PROPYL)PHOSPHATE *
TRIS(2-BUTOXYETHYL) PHOSPHATE *	TRIS (BETA-CHLOROETHYL) PHOSPHATE *	VAMIDOTHION SULFONE
VERNOLATE	VINCLOZOLIN (TOTAL) *	VINCLOZOLIN METABOLITE E
XMC	ZOXAMIDE	

[1] The list of pesticides detectable is expressed in terms of the parent pesticide. However, monitoring coverage and findings may have included metabolites, impurities, and alteration products.
[2] Some of these pesticides are no longer manufactured or registered for use in the United States.
[3] Chemicals indicated by a (+) were not found nor documented as recovered in previous years.

Animal Feeds

In FDA, the Center for Veterinary Medicine manages the Agency's pesticide in domestic and imported animal feed program. In FY 2008, 301 feed samples (177 domestic surveillance and 124 import) were analyzed for pesticides by the FDA (Table 4). Of the 177 domestic surveillance samples, 125 (70.6%) contained no detectable pesticide residues, 51 (28.8%) contained one or more detectable residues that did not exceed regulatory guidance, and one (0.6%) contained a residue which exceeded regulatory guidance. Of the 124 import samples, 93 (75.0%) contained no detectable pesticide residues, 30 (24.2%) contained one or more detectable residues that did not exceed regulatory guidance, and one (0.8%) contained a residue which exceeded regulatory guidance.

During FY 2008, one domestic surveillance sample of corn and one import sample of yucca schidigera powder each contained one residue that exceeded

regulatory guidance. The corn sample was from Texas and contained 0.030 ppm of methoxychlor, p,p'. All tolerances for this insecticide in Title 40 of the Code of Federal Regulations, part 180, section 120 (40 CFR 180.120) were revoked in 2002. The yucca schidigera powder sample was imported from Mexico and contained 1.504 ppm of diphenylamine. There are no tolerances established by the EPA for this fungicide on yucca in 40 CFR 180.190.

In the 52 domestic surveillance and 31 import samples of animal feed in which one or more pesticides were detected, there were 121 residues (95 quantifiable and 26 trace). Ethoxyquin and malathion were the most frequently found and accounted for 53.7% of all residues detected (Table 5).

Table 4 - Summary of the 177 Domestic Surveillance and 124 Import Samples of Animal Feed That Were Analyzed for Pesticides by FDA in Fiscal Year 2008

Type of Feed	# of Samples	Samples with No Pesticide Residues		Samples Exceeding Regulatory Guidance	
		#	%	#	%
Whole/Ground Grains	95	88	92.6	1	1.1
Plant By-products	93	74	79.6	0	0.0
Mixed Feed Rations	81	33	40.7	0	0.0
Hay and Hay Products	16	11	68.8	0	0.0
Supplements/Misc.	12	9	75.0	1	8.3
Animal By-products	4	3	75.0	0	0.0
TOTALS	301	218	(72.4)	2	(0.7)

Table 5 - Summary of the Pesticides in the 52 Domestic Surveillance and 31 Import Samples of Animal Feed Analyzed by FDA in FY 2008 That Contained One or More Detectable Residues

Pesticide	Number of Samples with			
	Trace Amounts[1]	Quantifiable Levels	Range[2] (ppm)	Median 2 (ppm)
Ethoxyquin[3]	6	37	0.018 - 38.0	1.179
Malathion	2	20	0.046 - 1.85	0.125
Chlorpyrifos-methyl	0	7	0.034 - 0.569	0.215
DDE + TDE + DDT	1	4	0.001 - 0.013	0.006
Diphenylamine	4	1	1.504	
Biphenyl	4	0		
Tetrachlorvinphos	0	3	0.276 - 13.8	2.13
Chlorpyrifos	0	3	0.044 - 0.273	0.13
Lambda-cyhalothrin	0	3	0.010 - 0.052	0.02
DCPA	3	0		
Bifenthrin	0	2	0.010 - 0.049	
Fenarimol	0	2	0.005 - 0.020	
Cypermethrin	1	1	0.14	
Ortho-phenylphenol	1	1	0.03	
All others[4]	4	11	0.008 - 0.515	0.084

[1] the residue found is below that normally quantifiable, but its presence and identity are known.
[2] in samples containing quantifiable levels.
[3] ethoxyquin is approved as a pesticide (plant regulator) at levels up to 3 ppm in 40 CFR 180.178. Ethoxyquin is also a feed additive (anti-oxidant) that is approved at levels up to 150 ppm in a finished article (21 CFR 573.380).
[4] n=1 for carbaryl (.014 ppm), chlorpropham (trace), DEF (.084 ppm), deltamethrin (.124 ppm), endosulfan I + II + sulfate (.515 ppm), iprodione (trace), methoxychlor, p,p' (.030 ppm), parathion methyl (.184 ppm), piperonyl butoxide (.363 ppm), pyridaben (trace), quinoxyfen (trace), trifloxystrobin (.008 ppm), trifluralin (.017 ppm), triphenyl phosphate (.402 ppm), and tris (2-ethylhexyl phosphate (.082 ppm).

Focused Sampling

As previously described, FDA conducts "focused sampling" by means of short-term, regulatory based, field assignments. During FY 2008, two pesticide-related field assignments,both titled "Sample Collection and Analysis of Imported Dietary Supplement and Botanical Products for Pesticides and Toxic Elements," were conducted and is reported here. (The assignments began prior to FY 2008 but were concluded in this fiscal year). In the first assignment, samples of imported dietary supplement products, including Ginkgo, Garcinia cambogia, Angelica, kava kava, and St. John's wort were to be collected. Sampling districts were also asked to continue collection of *Citrus aurantium,* milk thistle, Echinacea, and Saw palmetto from a previous assignment to obtain additional samples of these products. In the second assignment, samples of *Passiflora incarnate* L, *Gymnema sylvestre* R.*, Tribulus terrestris* L.*, Chenopodium ambrosioides* L.*, Glycyrrhiza glabra* L.*, Camellia sinenis* L *(green tea extract), Actaea racemosa* L *(black cohosh), Boswellia serrate* Roxb*., Vitis vinifera* (grape seed extract)*, and Codonopsis pilosula, were to be collected.*

The imported supplement products to be collected were to be in bulk dried, powdered, or ground forms, or bulk finished dosage form supplements such as capsules and tablets.

Summary of Results:

Note - Detailed results for these analyses can be found in the database tables provided on FDA's website (see "Acknowledgments" section). The data reported here reflects collections covered by the assignments and are primarily FY 2007 and FY 2008 analyses.

First Assignment - Eighty-seven samples were analyzed and consisted of Angelica (19 samples), Milk thistle (18), St. John's wort (13, Ginkgo (13), kava kava (10), Echinacea (7), Garcinia cambogia (4), *Citrus aurantium* (2), and Saw palmetto (1). Two samples were found to contain violative pesticide residues - a sample of St. John's wort extract from Canada for permethrin and a sample of

Echinacea tablets from Australia for dieldrin and p,p' DDT. No tolerances exist for these pesticides in these commodities.

Second Assignment - Eighty-nine samples were analyzed and consisted of *Passiflora incarnate* L (2 samples), *Gymnema sylvestre* R*. (6), Tribulus terrestris* L*.(15), Glycyrrhiza glabra* L*.(11), Camellia sinenis* L. *(37), Actaea racemosa* L. *(3), Boswellia serrate* Roxb (5)*, Vitis vinifera* (7)*, and Codonopsis pilosula (3*). Seven samples were found to contain violative residues, consisting of 6 green tea samples from China and a sample of Codonopis tangshen also from China. The green tea samples had levels of bifenthrin, fenvalerate, and/or lambda-cyhalothrin that exceeded tolerances for food products handled or processed in food handling establishments (there are no crop tolerances for these pesticides in tea). The sample of Codonopis tangshen had residues of endosulfan which has no tolerance for this commodity.

FDA Total Diet Study

Of the over 300 chemicals that can be determined by the analytical methods used in FDA's Total Diet Study, residues of 108 individual compounds were found in the foods analyzed in the four market baskets reported for FY 2008 (Market Baskets 07-4, 08-1, 08-2, and 08-3). The 108 individual compounds consisted of 83 parent pesticides and 25 related compounds (e.g., isomers, metabolites, degradation products) that are added to the parent pesticide for reporting and enforcement purposes.

Table 6 lists the most frequently found residues (those found in 2% or more of the samples) in the TDS foods other than infant and toddler foods, the total number of findings, and the percent occurrence in the four market baskets analyzed in FY 2008 (916 total samples). The five most frequently observed chemicals were DDT, malathion, dieldrin, endosulfan, and quintozene. Four of these five pesticides are the same as those observed for the past several years; the incidence of quintozene increased in FY 2008 replacing chlorpyrifos as the fifth most commonly found pesticide. The levels of these and other residues listed in Table 6 were typically below regulatory limits.

Table 6 – Frequency of Occurrence of Pesticide Residues in Total Diet Study for Foods Other Than Infant and Toddler Foods in FY 2008[1]

Pesticide [2]	Total No. of Findings	Occurrence, %	Range, ppm
DDT	204	22	0.0001-0.090
Malathion	112	12	0.0003-0.031
Dieldrin	98	11	0.0001-0.011
Endosulfan	97	11	0.0001-0.0645
Quintozene	88	10	0.0001-0.0217
Chlorpyrifos methyl	86	9	0.0001-0.025
Hexachlorobenzene	73	8	0.0001-0.001
Chlorpropham	66	7	0.0005-4.901
Chlorpyrifos	64	7	0.0002-0.063
Permethrin	44	5	0.0003-1.786
Thiabendazole [3]	37	4	0.001-0.435
Carbaryl [4]	27	3	0.0001-0.104
Phenylphenol, o-	23	3	0.003-0.475
Pirimiphos methyl	23	3	0.0001-0.363
Cypermethrin	19	2	0.0004-0.827
Toxaphene	16	2	0.003-0.054
Benomyl [3]	15	2	0.010-0.266
Dicloran	15	2	0.0004-0.142
Bifenthrin	14	2	0.001-0.056
Heptachlor	14	2	0.0001-0.0005

[1] Based upon 4 market baskets consisting of 915 total items.
[2] Isomers, metabolites, and related compounds are included with the 'parent' pesticide
[3] Reflects overall incidence; however, only 66-67 selected foods per market basket (i.e. 267 items total) were analyzed for Benzimidazole fungicides.
[4] Reflects overall incidence; however, only 81-82 selected foods per market basket (i.e. 327 items total) were analyzed for N-methylcarbamates.

The TDS program also collects and analyzes infant and toddler foods. Table 7 provides the frequency of occurrence of the pesticide residues that were found in 2% or more of these samples in the four collections of infant and toddler foods (212 samples total) in FY 2008 and the range of levels found. The results for FY 2008 are very consistent with those from FY 2007 and similar with those from earlier years.

Table 7 – Frequency of Occurrence of Pesticide Residues in the Total Diet Study for Infant and Toddler Foods in FY 2008[1]

Pesticide [2]	Total No. of Findings	Occurrence, %	Range, ppm
Thiabendazole[3]	41	20	0.001-0.165
Carbaryl[4]	31	15	0.001-0.228
Chlorpyrifos	29	14	0.0002-0.012
Captan	23	11	0.004-0.212
DDT	21	10	0.0001-0.0006
Ethylenethiourea[5]	19	9	0.003-0.017
Endosulfan	19	9	0.0001-0.0038
Chlorpropham	17	8	0.001-0.013
Diphenylamine	13	6	0.001-0.024
Pyrimethanil	12	6	0.002-0.023
Malathion	11	5	0.003-0.019
Biphenyl	11	5	0.001-0.006
Chlorpyrifos methyl	11	5	0.0006-0.018
Benomyl[c]	10	5	0.011-0.059
Phenylphenol, o-	9	4	0.003-0.045
Permethrin	9	4	0.0015-0.017
Iprodione	8	4	0.0001-0.027
Dieldrin	8	4	0.0001-0.009
Quintozene	7	3	0.0001-0.001
Hexachlorobenzene	6	3	0.0001-0.0005
Bifenthrin	6	3	0.0006-0.011
Boscalid	5	2	0.001-0.006
Methamidophos	5	2	0.003-0.016
Dimethoate	4	2	0.0008-0.003

[1] Based upon 4 market baskets consisting of 207 total items.
[2] Isomers, metabolites, and related compounds are included with the 'parent' pesticide
[3] Reflects overall incidence; however, only 34-35 selected foods per market basket (i.e. 138 items total) were analyzed for benzimidazole fungicides.
[4] Reflects overall incidence; however, only 34-35 selected foods per market basket (i.e. 138 items total) were analyzed for carbamate pesticides.
[5] Reflects overall incidence; however, only 29-30 selected foods per market basket (i.e. 118 items total) were analyzed for ethylenethiourea.

Summary

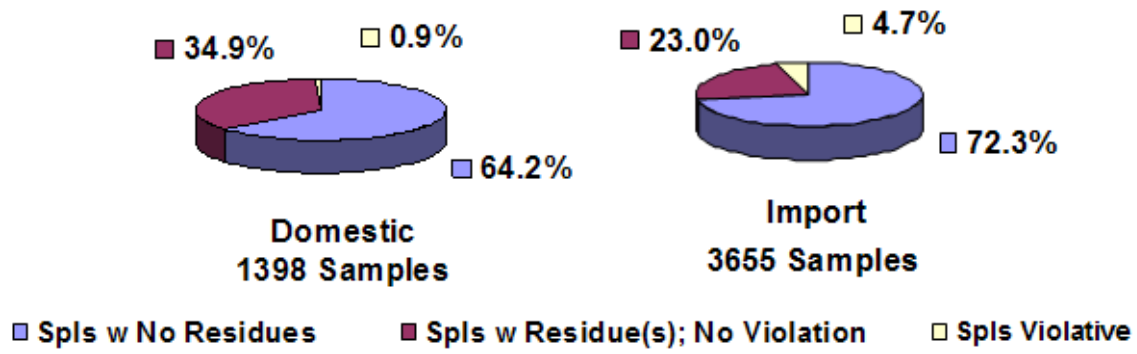
Regulatory Monitoring – FY 2008

A total of 5,053 samples of both domestically produced and imported food from 93 countries were analyzed for pesticide residues in FY 2008. No residues were

found in 64.2 % of domestic and 72.3 % of import samples (Figure 3) analyzed under FDA's regulatory monitoring approach in FY 2008. Only 0.9 % of domestic and 4.7 % of import samples had residue levels that were violative. The findings for FY 2008 demonstrate that pesticide residue levels in foods are generally well below EPA tolerances, corroborating results presented in earlier reports (6).

FDA also collected and analyzed 177 domestic and 124 import animal feed samples for pesticides. No residues were found in 70.6 % of the domestic feed samples and in 75.0 % of the import feed samples. One domestic sample (0.6 %) and one import sample (0.8 %) had residue findings for which no EPA or FDA acceptable levels have been established.

Figure 3 - Summary of Results of Domestic vs. Import Samples for FY 2008



Total Diet Study

In FY 2008, the types of pesticide residues found and their frequency of occurrence in TDS were generally consistent with those given in previous FDA reports. The pesticide residue levels found were well below regulatory standards. Results of baby foods tested in FY 2008 (and earlier years) also provide evidence of only low levels of pesticide residues in these foods.

Appendix A - Results of FY 2008 Domestic Samples by Commodity Group

Commodity Group		Total Samples Analyzed	Samples Without Residues %	Samples Violative %	Over Tolerance Violations #	No Tolerance Violations #
A. Grains and Grain Products	Barley & barley products	6	83.3	0	0	0
	Corn & corn products	57	86	0	0	0
	Oats & oat products	1	100	0	0	0
	Rice & rice products	11	90	0	0	0
	Wheat & wheat products	121	71.9	0	0	0
	Soybeans and soybean grain products	28	96.4	0	0	0
	Other grains & grain products	13	92.3	0	0	0
	Macaroni & noodles	1	100	0	0	0
	Breakfast cereals	4	75	0	0	0
	Bakery products, crackers, etc.	3	100	0	0	0
	Total	**245**	**80.8**	**0**	**0**	**0**
B. Milk/Dairy	Cheese & cheese products	4	50	0	0	0
	Eggs	1	100	0	0	0
	Milk/cream & milk products	2	100	0	0	0
	Total	**7**	**71.4**	**0**	**0**	**0**
C. Fish/Shellfish/ Other Aquatic Products	Fish and Fish Products	38	86.8	0	0	0
	Shellfish & Crustaceans	16	100	0	0	0
	Aquaculture seafood	7	100	0	0	0
	Other Aquatic Animals & Products	1	100	0	0	0
	Total	**62**	**91.9**	**0**	**0**	**0**
D. Fruits	Blackberries	5	20	0	0	0
	Blueberries	15	60	0	0	0
	Cranberries	15	53.3	0	0	0
	Grapes, raisins	9	33.3	0	0	0
	Raspberries	14	35.7	0	0	0
	Strawberries	21	33.3	0	0	0
	Grapefruit	5	60	0	0	0
	Lemons	1	100	0	0	0
	Oranges	21	33.3	0	0	0
	Other citrus fruit	7	71.4	0	0	0
	Apples	118	39	0	0	0
	Pears	14	42.9	0	0	0
	Other pome fruit	1	0	0	0	0
	Apricots	3	0	0	0	0
	Avocadoes	1	100	0	0	0
	Cherries	0	0	0	0	0
	Nectarines	5	60	0	0	0
	Peaches	29	34.5	0	0	0
	Plums	6	66.7	0	0	0
	Papaya	1	100	0	0	0

Commodity Group		Total Samples Analyzed	Samples Without Residues %	Samples Violative %	Over Tolerance Violations #	No Tolerance Violations #
	Pineapple	2	50	0	0	0
	Other sub-tropical fruit	1	100	0	0	0
	Cantaloupe	3	66.7	0	0	0
	Watermelon	4	75	0	0	0
	Other melons	0	0	0	0	0
	Other fruits/fruit products	13	38.5	0	0	0
	Apple juice	16	37.5	0	0	0
	Citrus juice	3	100	0	0	0
	Other fruit juices	0	0	0	0	0
	Fruit jams/jellies//toppings	0	0	0	0	0
	Total	**333**	**42.3**	**0**	**0**	**0**
E. Vegetable	Corn	25	100	0	0	0
	Mung beans and bean sprouts	12	66.7	8.3	0	1
	Peas (green/snow/sugar/sweet)	3	100	0	0	0
	String beans (green/snap/pole/long)	20	55	0	0	0
	Other beans & peas & products	86	93	1.2	0	1
	Cucumbers	30	66.7	3.3	0	1
	Eggplant	6	66.7	16.7	0	1
	Okra	5	100	0	0	0
	Peppers, hot	5	100	0	0	0
	Peppers, sweet	12	75	0	0	0
	Pumpkins	2	100	0	0	0
	Squash	41	75.6	0	0	0
	Tomatoes	55	74.5	0	0	0
	Asparagus	6	100	0	0	0
	Bok choy	3	33.3	0	0	0
	Broccoli	13	61.5	0	0	0
	Cabbage	43	74.4	0	0	0
	Cauliflower	3	100	0	0	0
	Celery	3	33.3	0	0	0
	Collards	5	40	0	0	0
	Kale	9	55.6	11.1	0	1
	Lettuce, head	5	100	0	0	0
	Lettuce, leaf	54	29.6	1.9	0	1
	Mustard greens	3	66.7	0	0	0
	Spinach	19	31.6	5.3	0	1
	Swiss chard	7	71.4	0	0	0
	Watercress	1	0	0	0	0
	Other leaf & stem vegetables	55	43.6	3.6	0	2
	Mushrooms and Truffles	18	72.2	0	0	0
	Carrots	25	32	8	0	2
	Onions/leeks/scallions/shallots	14	71.4	7.1	0	1

Commodity Group		Total Samples Analyzed	Samples Without Residues %	Samples Violative %	Over Tolerance Violations #	No Tolerance Violations #
	Potatoes	82	52.4	0	0	0
	Radishes	4	75	0	0	0
	Red beets	10	50	0	0	0
	Sweet potatoes	13	76.9	0	0	0
	Turnips	3	66.7	0	0	0
	Other root & tuber vegetables	4	50	0	0	0
	Other vegetables/vegetable products	9	55	0	0	0
	Total	**713**	**64.8**	**1.7**	**0**	**12**
F. Other	Peanuts & peanut products	7	100	0	0	0
	Almonds	15	100	0	0	0
	Refined oil	1	100	0	0	0
	Edible seeds & seed products	1	100	0	0	0
	Spices	7	85.7	14.3	0	1
	Water & ice	0	0	0	0	0
	Honey	2	100	0	0	0
	Confections	1	0	0	0	0
	Feed/Animal Byproducts	4	50	0	0	0
	Total	**38**	**89.5**	**2.6**	**0**	**1**
Totals A-F		**1398**	**64.2**	**0.9**	**0**	**13**

Appendix B - Results of FY 2008 Import Samples by Commodity Group

Commodity Group [a]		Total Samples Analyzed	Samples Without Residues %	Samples Violative %	Over Tolerance Violations #	No Tolerance Violations #
A. Grains and Grain Products	Barley & barley products	9	88.9	0	0	0
	Corn & corn products	10	80	10	0	1
	Oats & oat products	4	100	0	0	0
	Rice & rice products	34	88.2	2.9	0	1
	Soybeans & soy flour	4	75	0	0	0
	Wheat & wheat products	32	84.4	0	0	0
	Other grains & grain products	23	91.3	0	0	0
	Bakery products, doughs, crackers, etc.	17	88.2	0	0	0
	Macaroni and noodles	16	100	0	0	0
	Cereals	9	100	0	0	0
	Snack foods	6	83.3	0	0	0
	Total	**164**	**89**	**1.2**	**0**	**2**
B. Milk/Dairy Products/Eggs	Cheese & cheese products	3	100	0	0	0
	Eggs (includes duck & quail)	3	33.3	0	0	0
	Milk/cream & milk products	24	91.7	0	0	0
	Total	**30**	**86.7**	**0**	**0**	**0**
C. Fish/Shellfish/ Other Aquatic Products	Fish and Fish Products	141	94.3	0	0	0
	Shellfish & Crustaceans	22	81.8	0	0	0
	Other Aquatic Animals & Products	4	100	0	0	0
	Aquaculture Seafood	59	91.5	0	0	0
	Total	**226**	**92.5**	**0**	**0**	**0**
D. Fruits	Blackberries	35	65.7	5.7	0	2
	Blueberries	31	58.1	0	0	0
	Cranberries	6	66.7	0	0	0
	Currants	5	60	0	0	0
	Grapes, raisins	37	32.4	8.1	0	3
	Raspberries	35	57.1	2.9	0	1
	Strawberries	46	39.1	4.3	0	2
	Other berries	13	53.8	30.8	0	4
	Clementines	5	40	0	0	0
	Grapefruit	0	0	0	0	0
	Lemons	3	100	0	0	0
	Limes	7	85.7	0	0	0
	Oranges	11	72.7	0	0	0
	Other citrus fruit	6	50	16.7	0	1
	Apples	19	63.2	10.5	2 [b]	0
	Pears	18	61.1	0	0	0
	Other pome/core fruit	10	100	0	0	0
	Apricots	17	70.6	5.9	0	1

Commodity Group [a]		Total Samples Analyzed	Samples Without Residues %	Samples Violative %	Over Tolerance Violations #	No Tolerance Violations #
	Avocadoes	11	100	0	0	0
	Cherries	16	12.5	6.3	1 [b]	0
	Dates	17	64.7	11.8	0	2
	Nectarines	5	40	0	0	0
	Olives	29	96.6	3.4	0	1
	Peaches	19	57.9	0	0	0
	Plums/Prunes	10	60	0	0	0
	Other pit fruit	5	40	60	0	3
	Ackees, lychees, longans	9	88.9	0	0	0
	Bananas, plantains	20	70	0	0	0
	Breadfruit, jackfruit	6	83.3	0	0	0
	Figs	4	75	0	0	0
	Guavas	14	78.6	7.1	0	1
	Kiwi fruit	5	60	0	0	0
	Mangoes	38	89.5	0	0	0
	Papaya	22	27.3	22.7	0	5
	Pineapple	13	76.9	0	0	0
	Pepinos	14	50	28.6	0	4
	Other sub-tropical fruit	19	89.5	0	0	0
	Bitter melon	6	33.3	0	0	0
	Cantaloupe	7	57.1	0	0	0
	Honeydew	3	33.3	0	0	0
	Watermelon	2	50	0	0	0
	Apple juice	28	89.3	0	0	0
	Pear juice	8	75	0	0	0
	Citrus juice	14	100	0	0	0
	Subtropical juice/milk/drink/nectar	40	100	0	0	0
	Pomegranate juice	3	66.7	0	0	0
	Other fruit juices	35	85.7	0	0	0
	Fruit butters, jams, jellies, preserves, syrups, toppings, etc.	25	72	8	0	2
	Other fruits and fruit products	20	80	10	0	2
	Total	**771**	**67.7**	**4.8**	**3**	**34**
E. Vegetables	Corn	27	96.3	0	0	0
	Bean sprouts and seeds	41	87.8	0	0	0
	Peas (green/snow/sweet)	42	64.3	4.8	0	2
	Sugar snap peas	8	75	12.5	0	1
	Garbanzo beans	22	90	0	0	0
	Kidney beans	12	83.3	0	0	0
	Mung beans	18	100	0	0	0
	Soybeans	19	89.5	0	0	0
	String beans (green/snap/pole)	86	51.2	10.5	0	9
	Other beans & peas & products	153	87.6	3.3	2 [c]	3
	Cucumbers	104	36.6	5.8	0	6

Commodity Group [a]		Total Samples Analyzed	Samples Without Residues %	Samples Violative %	Over Tolerance Violations #	No Tolerance Violations #
	Eggplant	28	71.4	7.1	2	0
	Okra	32	78.1	9.4	0	3
	Peppers, hot	209	52.6	10.5	2 [b]	20
	Peppers, pimernto	15	60	6.7	0	1
	Peppers, sweet	83	53	2.4	0	2
	Squash/pumpkins	86	45.3	0	0	0
	Tomatoes/Tomatillos	82	68.3	2.4	1	1
	Choyote	3	100	0	0	0
	Other fruiting vegetables	23	47.8	8.7	0	2
	Artichokes	13	84.6	0	0	0
	Asparagus	40	87.5	0	0	0
	Bamboo shoots	6	100	0	0	0
	Bok choy & Chinese cabbage	2	0	0	0	0
	Broccoli	72	72.2	1.4	0	1
	Brussels sprouts	20	60	0	0	0
	Cabbage	13	76.9	0	0	0
	Cauliflower	14	71.4	0	0	0
	Celery	14	71.4	14.3	0	2
	Cilantro	6	33.3	33.3	1 [b]	1
	Collards	1	0	0	0	0
	Kale	2	0	0	0	0
	Lettuce, head	13	61.5	7.7	1	0
	Lettuce, leaf	28	42.9	0	0	0
	Mustard greens	8	12.5	0	0	0
	Spinach	47	57.4	0	0	0
	Other leaf & stem vegetables	61	60.7	14.8	3 [c]	6
	Mushrooms/truffles/fungi	26	80.8	3.8	0	1
	Carrots	42	81	2.4	0	1
	Cassava	8	100	0	0	0
	Garlic	10	100	0	0	0
	Ginger	9	88.9	0	0	0
	Leeks	11	54.5	18.2	0	2
	Onions	17	76.5	0	0	0
	Potatoes	41	48.8	2.4	0	1
	Radishes	16	43.8	0	0	0
	Red beets	13	69.2	0	0	0
	Scallions	65	70.8	0	0	0
	Sweet potatoes	16	81.2	6.2	0	1
	Taro/dasheen	7	85.7	14.3	0	1
	Turnips	5	100	0	0	0
	Water chestnuts	4	100	0	0	0
	Other root & tuber vegetables	19	89.5	0	0	0
	Vegetables with sauce	36	86.1	2.8	0	1

Commodity Group [a]		Total Samples Analyzed	Samples Without Residues %	Samples Violative %	Over Tolerance Violations #	No Tolerance Violations #
	Other vegetable products (juice/drinks/mixed/breaded/etc.)	41	80.5	0	0	0
	Total	**1839**	**66.3**	**4.4**	**12**	**68**
F. Other	Cashews	14	100	0	0	0
	Coconut & coconut products	7	100	0	0	0
	Peanuts & peanut products	7	100	0	0	0
	Pecans	5	100	0	0	0
	Other nuts & nut products	11	100	0	0	0
	Pumpkin seeds	4	100	0	0	0
	Sesame seeds	11	81.8	0	0	0
	Sesame paste (tahina)	7	100	0	0	0
	Soybeans, edible	9	88.9	11.1	0	1
	Sunflower seeds	5	100	0	0	0
	Other edible seeds & seed products	17	100	0	0	0
	Vegetable oil, crude	6	100	0	0	0
	Vegetable oil, refined	6	66.7	0	0	0
	Oil Seed Stock	1	0	0	0	0
	Other vegetable oil products	3	100	0	0	0
	Basil	8	37.5	50	0	4
	Capsicums	10	30	50	0	5
	Pepper sauce	15	80	6.7	0	1
	Spices, other	31	80.6	6.5	0	2
	Condiments	7	85.7	0	0	0
	Beverages, ice, & water	18	100	0	0	0
	Beverage bases	8	87.5	0	0	0
	Beer	1	100	0	0	0
	Coffee	11	100	0	0	0
	Tea	42	71.4	14.3	6	0
	Coffee/tea substitutes	5	100	0	0	0
	Candy, chocolate, cocoa products	26	84.6	0	0	0
	Honey & honey products	69	100	0	0	0
	Multiple foods (dinners, sauces, & specialties)	28	85.7	0	0	0
	Sweeteners other than honey	13	100	0	0	0
	Baby foods/formula	2	100	0	0	0
	Ginseng, dietary supplement/teas	42	50	33.3	2 [b]	12

Commodity Group [a]		Total Samples Analyzed	Samples Without Residues %	Samples Violative %	Over Tolerance Violations #	No Tolerance Violations #
	Kava kava (dietary supplement)	7	42.9	57.1	0	4
	Other dietary supplements	146	80.1	10.3	1 [b]	14
	Other food products	18	94.4	0	0	0
	Food additives/colors	3	100	0	0	0
	Nonfood items	2	50	0	0	0
	Total	**625**	**83.2**	**8.3**	**9**	**43**
Totals A-F		**3655**	**72.3**	**4.7**	**24**	**147**

[a] whole food commodities include dried, paste, pulp, and puree forms, as well as foods similarly classified by EPA for residue tolerance enforcement (e.g., eggplant includes Chinese/Thai eggplant; radishes include daikon or Chinese/Oriental radishes)

[b] samples contained both over-tolerance and no tolerance residues; for this report counted as an “over-tolerance” violation.

[c] one sample contained both over-tolerance and no tolerance residues; for this report counted as an “over-tolerance” violation.

[d] three samples contained both over-tolerance and no tolerance residues; for this report counted as an “over-tolerance” violation

Note: “Over-tolerance” violations include residue findings for pesticides that exceeded tolerances for establishments where food products are held, processed, or prepared.